

## ABSTRACT OF THE DISCLOSURE

There is provided a transmit antenna array device with at least two antennas and a method thereof in which a transmission beam is appropriately  
5 formed based on a weight vector to be transmitted to a specific mobile station in a mobile communication system. For this purpose, a base station device has a reverse processor for processing a reverse signal received through the antenna array, a forward fading information extraction unit for extracting forward fading information from the received reverse signal, a beam formation controller for  
10 generating a weight vector for formation of a transmission beam using the forward fading information and the received reverse signal, and a forward processor having a transmission beam generator for generating a transmission beam for a transmission message based on the weight vector. A mobile station device has a forward processor for processing a received forward signal, a  
15 forward fading estimator for estimating forward fading information of the forward signal for each path, a forwarding fading encoder for combining the estimated forward fading information and encoding the combined forward fading information, and a reverse processor for multiplexing the encoded forward fading information with a transmission message and feeding back the forward fading  
20 information in the multiplexed signal to a base station.